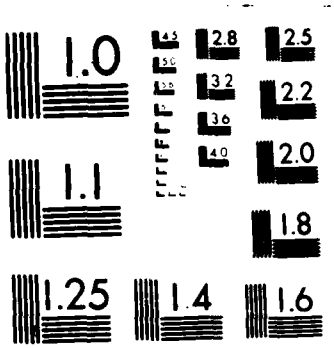
AD-A179 856 NCEL (NAVAL CIVIL ENGINEERING LABORATORY) QUARTERLY 1/1
ABSTRACTS OF TECHNICAL DOCUMENTS 1 JANUARY 87 TO 31
MARCH 1987(U) NAVAL CIVIL ENGINEERING LAB PORT HUENEME
UNCLASSIFIED CA 31 MAR 87 F/G 13/2 NL



SEE BACK COVER FOR READER RESPONSE CARD

NCEL QUARTERLY ABSTRACTS

of technical documents

1 Jan 1987 to 31 Mar 1987

Naval Civil Engineering Laboratory
Port Hueneme, California 93043-5003

NCEL ABSTRACTS are intended to alert users of the availability of documented results of research at the Naval Civil Engineering Laboratory, contained in:

Technical Reports (R-series)
Significant developments; advances in state of the art; information concluding major work projects.

Technical Notes (N-series)
Detailed reports of progress, accumulated data and findings.

Contract Reports (CR-series)
Technical documentation of work performed by contractors for NCEL

Techdata Sheets (TDS-series)
Summarizes new techniques, hardware development, etc.; "early lead" information based on TR, TN or CR publications, or on ongoing research at NCEL.

Availability of Publications Listed in NCEL ABSTRACTS

AD numbers ending with L: Distribution limited to U.S. Government agencies only

AD numbers not ending with L: Public release, distribution unlimited.

NEED HELP WITH NCEL TECHNOLOGY?

NCEL provides assistance that is as near as your phone. We have scientists and engineers in many disciplines which allows us to provide quick-response on field problems. EFDs, PWOs, PWCs, OICCs, ROICCs, SEABEES, and CEC officers worldwide can request limited services free of charge. Please contact the Facilities Engineering Support Office (FESO) by any means.

Our 24-hour answering service
AUTOVON: 360-4070
COMM: (805) 982-4070

Message address:
NAVCIVENGRLAB Port Hueneme, CA

Mail address:
Commanding Officer
Code L03C (J. Dummer)
Naval Civil Engineering Laboratory
Port Hueneme, CA 93043-5003

TABLE OF CONTENTS

page

TECHNICAL NOTES

N-1763 Initial Feasibility Study and Budget for a Hazardous Waste Incinerator 1

N-1764 Validation of Nitronic 33 in Reinforced and Prestressed Concrete 1

CONTRACT REPORTS

CR 87.001 Economic Analysis for Recycling Plastic Media: Final Report 2

CR 87.004 Algorithms for the Integration of Inelastic Constitutive Equations Including Rate and Damage (short title) 2

CR 87.007 Plastic Media Blasting Monitoring at Hill AFB, UT and NARF, Pensacola, FL: Final Test Report 2

CR 87.008 A Consistent Finite Element Formulation of Nonlinear Frictional Contact Problems 3

TECHNICAL NOTES

N-1763
Initial Feasibility Study and Budget for a Hazardous Waste Incinerator at Pearl Harbor Naval Shipyard, Jan 1987, William Powers, CHMM and Richard Lee, PhD (public release)

Spurred by increasing regulatory restrictions, rising costs for transport and disposal, and the lack of suitable hazardous waste disposal sites in Hawaii, Pearl Harbor Naval Shipyard (PHNSY) is considering incineration as a potentially cost-effective and desirable means of disposal. The Naval Civil Engineering Laboratory (NCEL) at Port Hueneme, California, was accordingly tasked with preparation of this initial feasibility study and budget estimate. It is estimated that PHNSY will require a rotary kiln incinerator capable of handling 4,000 to 8,000 lb/hr of hazardous waste. Capital costs for the physical plant were estimated to range from $2,992,000 to $3,781,000. Total operation and maintenance (O&M) costs are estimated at $1,604,000 annually without a heat recovery system. If a heat recovery system (boiler) is used the O&M costs could be reduced to between $1,143,000 and $97,000 annually. It is estimated that the payback for this system will be in the first year, considering present costs of disposal.

N-1764
Validation of Nitronic 33 in Reinforced and Prestressed Concrete, Mar 1987, James F. Jenkins (public release)

Nitronic 33 stainless steel (Trademark of Armco Steel Corporation) has a unique combination of high strength and nonmagnetic properties which make it an excellent candidate for use as prestressing strand for concrete waterfront structures where the magnetic properties of the carbon steel commonly used for prestressing strand are not acceptable. Before Nitronic 33 stainless steel prestressed concrete waterfront structures were constructed, it was necessary to establish the corrosion performance of the Nitronic 33 stainless steel in marine concrete. A test plan was developed where a series of tests which compared the performance of carbon steel to the Nitronic 33 stainless steel were to be performed. The time to initiation of attack was established as the critical parameter for the evaluation of the test results. In each test, corrosion of the carbon steel initiated prior to the initiation of the corrosion of the Nitronic 33 stainless steel. In addition, previously emplaced full-scale pier pilings with both carbon steel and Nitronic 33 stainless steel prestressing were inspected. The corrosion activity of the Nitronic 33 stainless steel prestressed piling was less than that of the companion carbon steel prestressed pilings.

It was concluded that prestressed concrete waterfront structures using Nitronic 33 as prestressing strand should perform at least as well as similar structures using carbon steel prestressing. Recommendations for additional work to evaluate possible differences in inspection, maintenance, and repair techniques required for Nitronic 33 stainless steel prestressed concrete waterfront structures are presented.

CONTRACT REPORTS

CR 87.001
Economic Analysis for Recycling Plastic Media: Final Report, Feb 1987, Engineering Management Concepts, Camarillo, CA, N00123-85-C-0191 (public release)

This report contains an evaluation of the economics of recycling plastic media from paint stripping operations, the types of recycling equipment available, and the recycling requirements needed to maintain an effective media size. Specific results include: At least 30% of the plastic media must be recovered to reach the economic break-even point for plastic media blasting versus chemical stripping; recycling equipment must be able to return at least 58% of the media to the blasting pot to achieve a 30% recovery rate (because the media is used several times); gravity separators, vibrating screens, cyclone separators, and mechanic air separators can achieve the 58% recycling rate; and media smaller than 60 mesh will not strip point and should be removed from the recycled media.

CR 87.004
Algorithms for the Integration of Inelastic Constitutive Equations Including Rate and Damage (short title), Feb 1987, Thomas J.R. Hughes, 903 Cottrell Way, Stanford, CA, N68305-5070-4015 (public release)

Algorithms for integrating general classes of inelastic constitutive equations are described. The procedures reduce to the classical radial-return algorithm for J_2-flow theory and include extensions to isotropic elastic damage and Perzyna-type viscoplasticity. The methodology is applied to the cap model, which is useful for simulating the response of soils and concrete, and a uniquely simple and effective algorithm is developed which corrects shortcomings of previous implementations.

CR 87.007
Plastic Media Blasting Monitoring at Hill AFB, UT and NARF, Pensacola, FL: Final Test Report, Feb 1987, Engineering Management Concepts, Camarillo, CA, N00123-85-D-1091 (limited release)

The monitoring at Plastic Media Blasting (PMB) facilities was centered on the collection and analysis of data to investigate the safety of PMB. Data was collected for a small blast cabinet, commonly referred to as a "glove box," and for a blast facility large enough to accommodate an aircraft. Data were collected in dust and metal concentrations in the airborne and waste dust and in noise, temperature, and ventilation rates. Recommendations on safety equipment, safety standards, and ventilation rates are given.

CR 87.008

A Consistent Finite Element Formulation of Nonlinear Frictional Contact Problems, Mar 1987, Jiann-wen Ju, Robert L. Taylor, Louis Y. Cheng, Department of Civil Engineering, University of California, Berkeley, N62583/86 MT 167 (public release)

A perturbed Lagrangian-based variational formulation is proposed for the finite element solution of fully nonlinear frictional contact problems. In the spirit of an operator splitting methodology, an analogy exists between the proposed treatment for the stick-slip motion and the corresponding treatment in elastoplasticity.

Within the context of discrete formulations arising from a finite element approximation, explicit expressions for the frictional consistent contact tangent stiffness and residual are derived from variational equations by using a consistent linearization procedure for both the sliding and adhesion phases. The consistent tangent operator is always nonsymmetric for the case of frictional sliding owing to the nature of the Coulomb's friction law employed.

For two-dimensional applications, a three-node contact element is employed in the finite element discretization. Numerical examples are also presented that illustrate the performance of the proposed formulation.

DEPARTMENT OF THE NAVY

NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME CALIFORNIA 93043-5003

Commanding Officer
Code L08B
Naval Civil Engineering Laboratory
Port Hueneme, California 93043-5003

☐ REMOVE MY NAME FROM DISTRIBUTION LIST FOR NCEL ABSTRACTS

☐ SEND NCEL QUARTERLY ABSTRACTS TO (add to your list):

_____

_____

_____

☐ CHANGE MY ADDRESS TO:

_____

_____

_____

I WOULD LIKE TO RECEIVE THE FOLLOWING DOCUMENTS
(circle document number) :

	CR 87.001
N-1763	CR 87.004*
N-1764*	CR 87.007
	CR 87.008*

*available after May 15

If documents are needed urgently, NCEL maintains a 24-hour answering service for your convenience. Call: (805) 982-4651 or autovon 360-4651.

READER RESPONSE CARD

(fold here)

Tear on perforated line

DEPARTMENT OF THE NAVY

NAVAL CIVIL ENGINEERING LABORATORY
PORT HUENEME, CALIFORNIA 93043-5003

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300
1 IND-NCEL 2700/4 (REV 12-79)
0830-LL-L70-0044

POSTAGE AND FEES PAID
DEPARTMENT OF THE NAVY
DOD-316

U.S.MAIL

442 - 08 028 - 06 1

Defense Technical Information Center
Cameron Station
Alexandria, VA 22304-6145

Note: Numbers on label but not listed above are for NCEL use, please ignore them.

END

5-87

DTIC